

What is claimed is:

1. A system for managing packets incoming to a data router comprising:

5 a local packet memory (LPM) mapped into pre-configured memory units, to store packets for processing;

an external packet memory (EPM);

a first storage system to store packets in the LPM; and

a second storage system to store packets in the EPM;

10 characterized in that the first storage system attempts to store all incoming packets in the LPM, and for those packets that are not compatible with the LPM, relinquishes control to the second system, which stores the LPM-incompatible packets in the EPM.

15 2. The system of claim 1 wherein the first storage system is hardware-controlled and the second storage system is software-controlled.

3. The system of claim 1 wherein the pre-configured memory units comprise memory blocks of pre-programmed size available for consecutive 20 packet storage within the memory.

4. The system of claim 1 wherein the data router is connected to and operates on the Internet network.

25 5. The system of claim 1 wherein the data router is connected to and operates on a corporate wide-area-network (WAN).

6. The system of claim 2 wherein the first storage system is implemented as an integrated circuit (IC) or IC chip set.

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7. The system of claim 1 wherein the first storage system provides a memory address to the second storage system in the event of upload of a packet into the second memory.

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8. A data packet router comprising:

external ports to receive and send data packets from and to neighboring connected routers; and
a system for managing packets incoming to a data router, the system having a local packet memory (LPM) mapped into pre-configured memory units, to store packets for processing, an external packet memory (EPM), a first storage system to store packets in the LPM; and a second storage system to store packets in the EPM;

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characterized in that the first storage system attempts to store all incoming packets in the LPM, and for those packets that are not compatible with the LPM, relinquishes control to the second system, which stores the LPM-incompatible packets in the EPM.

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9. The router of claim 8 wherein the first storage system is hardware-controlled and the second storage system is software-controlled.

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10. The router of claim 8 wherein the pre-configured memory units comprise memory blocks of pre-programmed size available for consecutive packet storage within the LPM .

11. The router of claim 8 wherein the data router is connected to and operates on the Internet network.

12. The router of claim 8 wherein the data router operates on a corporate wide-area-network.

13. A method for managing packets incoming to a data router, comprising
5 the steps of:

(a) attempting to store all incoming packets, by a first storage system, into a local packet memory (LPM) that is mapped into pre-configured memory units;

10 (b) relinquishing packets incompatible with the LPM to a second storage system; and;

(c) storing the LPM-incompatible packets in an external packet memory by a second storage system.
14. The method of claim 13 wherein the data router is connected to and operates on the Internet network.

15 14. The method of claim 13 wherein the first storage system is hardware-controlled and the second storage system is software controlled.

15. The method of claim 13 wherein in the data router is connected to and operates on a corporate wide-area-network (WAN).

20 16. The method of claim 13 wherein in step (a) the pre-configured memory units comprise memory blocks of pre-programmed size available for consecutive packet storage within the memory.

25 17. The method of claim 13 wherein the first and second storage systems are implemented as an integrated circuit (IC) or IC chip set.

18. The method of claim 17 wherein in step (c) the second storage system is software-controlled.

19. A method for retrieving a data packet stored in an external packet memory (EPM) in a data router , comprising the steps of:

5 (a) receiving a notification that packet processing is complete for a particular packet;

10 (b) determining that the particular packet does not reside in a first memory;

15 (c) requesting software to download the packet from the external packet memory, the download to begin at a pre-specified memory address provided with the request;

20 (d) downloading the data packet from the overflow memory via software; and

25 (e) performing routine packet accounting via hardware after the download is complete.

20. The method of claim 19 wherein the data router is connected to and operates on the Internet network.

20. The method of claim 19 wherein the data router is connected to and operates on the Internet network.

25. The system of claim 1 wherein storage of packets in the EPM is enabled by a user-controlled mechanism, and if not enabled, packets found to be not compatible with the LPM are simply dropped.

24. The system of claim 1 wherein, if a first packet is dropped, a lock is asserted to prevent any other packet being dropped until the system has finished all processing associated with the first packet dropped.

5 25. The system of claim 24 further comprising a mechanism for determining packet source, wherein lock is asserted only for packets having the same source as a packet dropped.

10 26. The system of claim 24 wherein the mechanism for asserting a lock involves a lock bit managed by software.

27. The system of claim 25 wherein lock bits are provided for each packet source, enabling lock to be device-dependent.

15 28. The system of claim 27 wherein the lock bits are bits of a common configuration register.

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